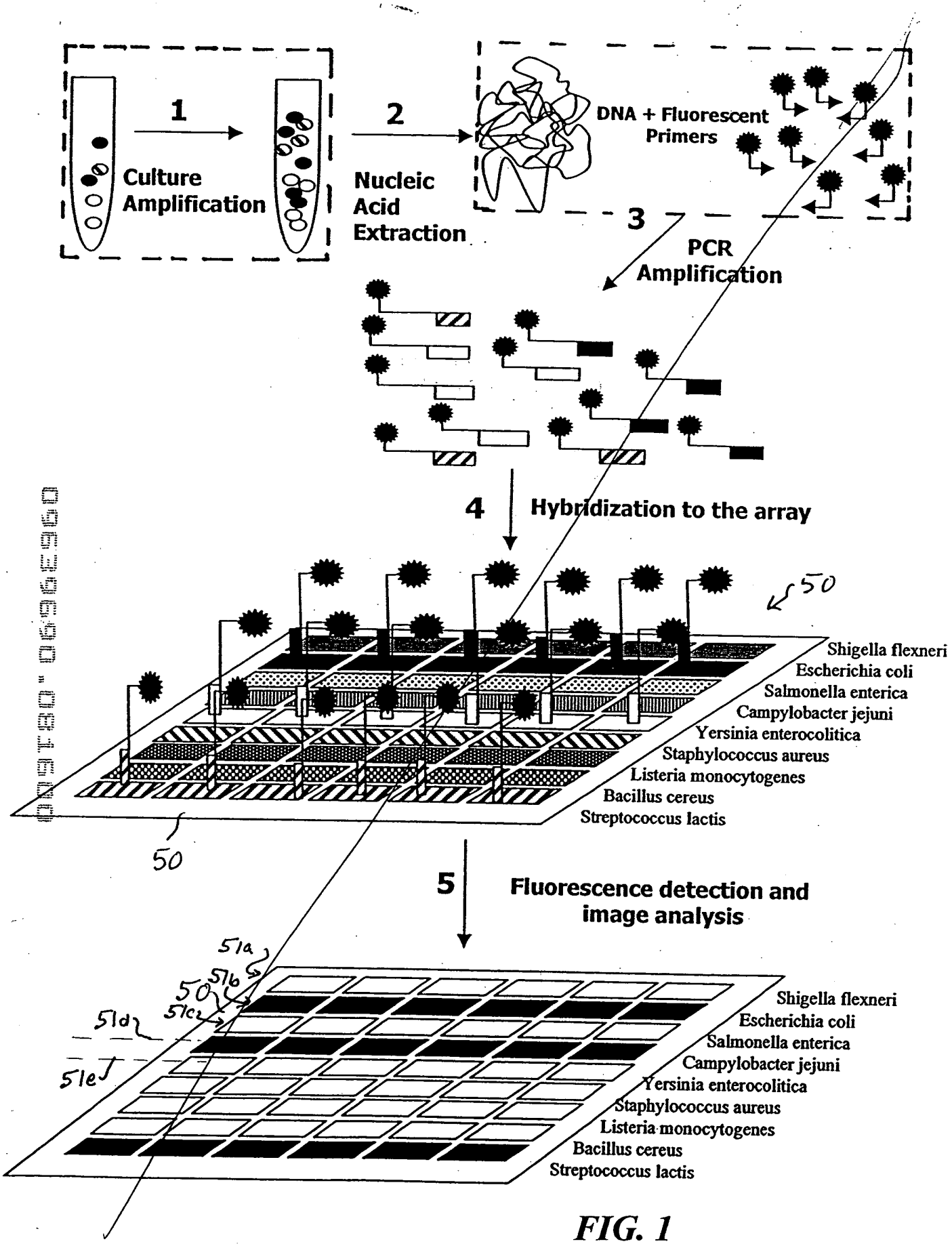
1
Culture Amplification
2
Nucleic Acid Extraction
DNA + Fluorescent Primers
3
PCR Amplification
4
Hybridization to the array
50
Shigella flexneri
Escherichia coli
Salmonella enterica
Campylobacter jejuni
Yersinia enterocolitica
Staphylococcus aureus
Listeria monocytogenes
Bacillus cereus
Streptococcus lactis
50
5
Fluorescence detection and image analysis
51a
51b
50
51c
51d
51e
Shigella flexneri
Escherichia coli
Salmonella enterica
Campylobacter jejuni
Yersinia enterocolitica
Staphylococcus aureus
Listeria monocytogenes
Bacillus cereus
Streptococcus lactis

FIG. 1

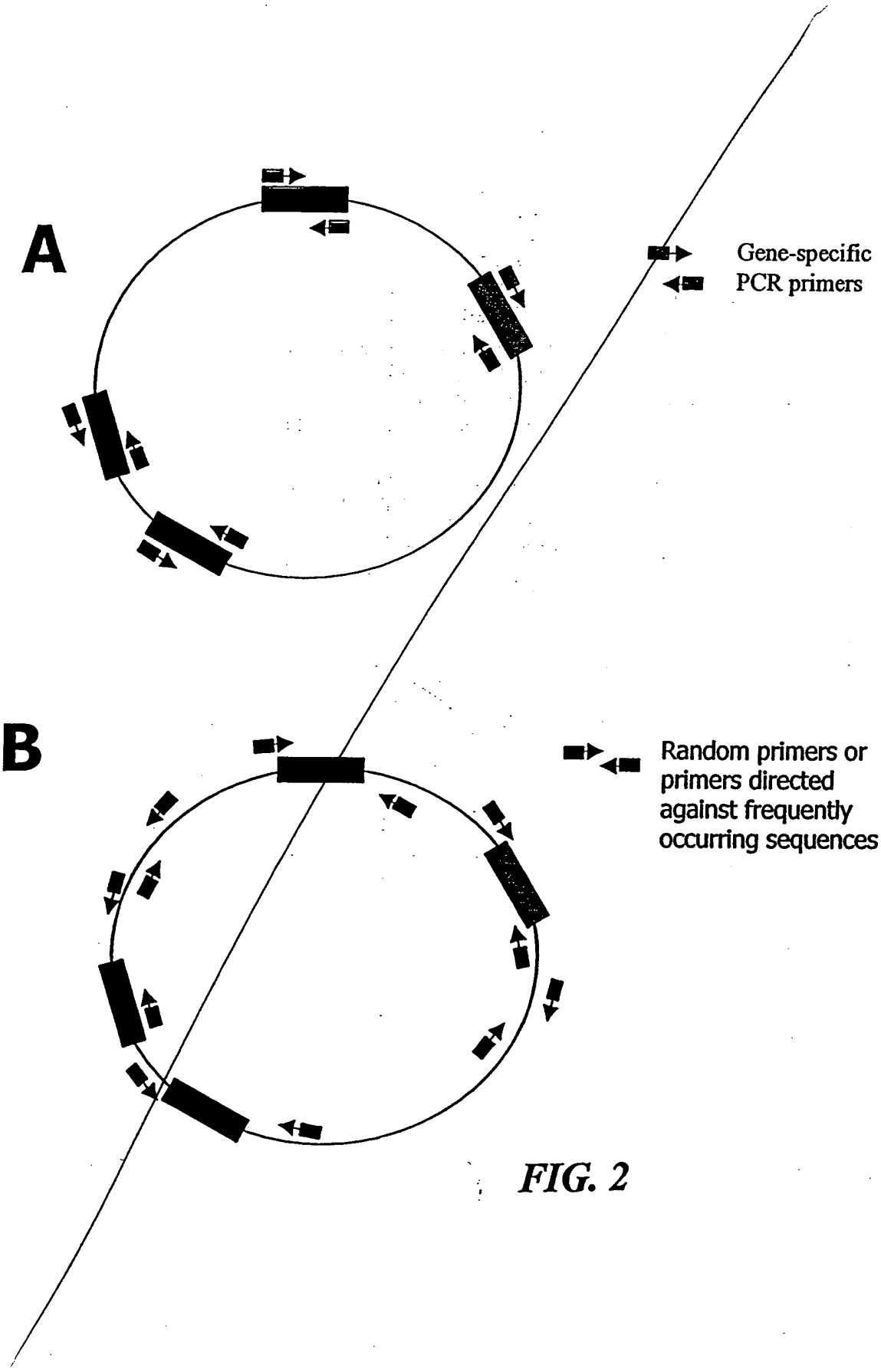
A
Gene-specific
PCR primers
B
Random primers or
primers directed
against frequently
occurring sequences

FIG. 2

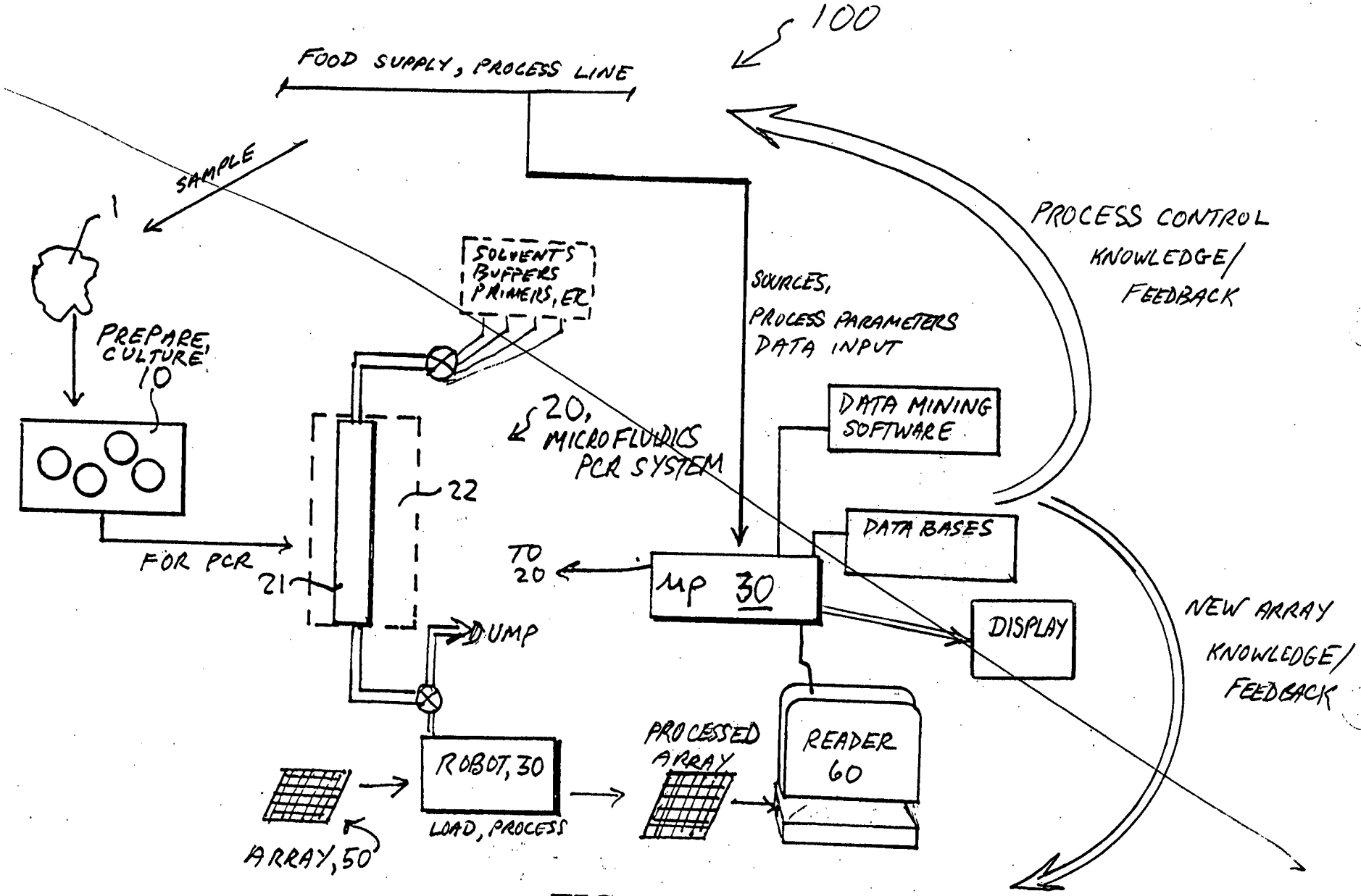
100
FOOD SUPPLY, PROCESS LINE
SAMPLE
1
SOLVENTS BUFFERS PRIMERS, ETC
PREPARE CULTURE 10
SOURCES, PROCESS PARAMETERS DATA INPUT
PROCESS CONTROL KNOWLEDGE/ FEEDBACK
20, MICROFLUIDICS PCR SYSTEM
DATA MINING SOFTWARE
22
DATA BASES
FOR PCR
21
TO 20
MP 30
DISPLAY
NEW ARRAY KNOWLEDGE/ FEEDBACK
DUMP
PROCESSED ARRAY
READER 60
ROBOT, 30
LOAD, PROCESS
ARRAY, 50

FIG. 3

Gene target table for model array

	A-B	C-D	E-F	G-H	I-J	K-L	M-N	O-P	Q-R	S-T	U-V	W-X
1 Bacillus/Listerial	Bacillus Hemolysin BL (*hblA*)	Bacillus Entero-toxin B (*entB*)	Bacillus *dacF*	Bacillus *spoIIGA*	Bacillus *sigE*	Bacillus *sigF*	Bacillus Entero-toxin A (*hblB*)	Bacillus *spoOA*	Bacillus *spoIIAA*	Listeria *lpa-p60*	Listeria *ltrA*	Listeria *mpl*
2 Controls	Blank	Blank	Control *gfp*	Control *gfp* 1:10	Control *gfp* 1:100	Control *gfp* 1:1000			Control *gfp*	Control *gfp*		
3 Campylobacter/Listeria	Campy *pglA*	Campy *cipA*	Campy *lig3*	Campy *flaB*	Campy *ciaE*	Campyb *folP*	Campy *pglD*	Campyl *pglF*	Campy *pglB*	Listeria *inlB*	Listeria *hlyA*	Listeria *inlA*
4 E.coli/Listeria	E.coli *asp*tRNA	E.coli 23sRNA	E.coli *lacZ*	E.coli *thr*tRNA	E.coli *hlyD*	E.coli *gdh*	E.coli *rpoS*	E.coli *uidA*	E.coli *air*	Listeria *prfA*	Listeria *plcB*	Listeria *plcA*
5 Yersinia/O157	Yersinia *yopD*	Yersinia *yopB*	Yersinia *yopH*	Yersinia *yopE*	Yersinia *lcrV*	Yersinia *virF*	Yersinia *yopN*	Yersinia *yopP*	Yersinia *yopM*	O157:H7 *ehxA*	O157:H7 *hlyA*	O157:H7 *toxB*
6 Staphylococcus aureus/E. coli O157:H7	S. aureus *entG*	S. aureus *sarA*	S. aureus *entA*	S. aureus *entD*	S. aureus nuclease	S. aureus *set1A*	S. aureus *agrB*	S. aureus *entI*	S. aureus *tsst-1*	O157:H7 *espP*	O157:H7 *eaeA*	O157:H7 *etpC*
7 Shigella/E. coli O157:H7	Shigella *fur*	Control *gfp*	Shigella *icsB*	Shigella *stxA*	Shigella *ipaC*	Shigella *vacB*	Control *gfp*	Shigella *ipaB*	Shigella *virR*	Shigella *sod*	Control *gfp*	Shigella *virF*
8 Salmonella/E. col O157:H7	Salmonella *sopE*	Salmonella *pagC*	Salmonell *invJ*	Salmonell *spiA*	Salmonell *prgK*	Salmonell *traJ*	Salmonell *traK*	Salmonell *invH*	Salmonell *traB*	O157:H7 *Ronp*	O157:H7 *stx2*	O157:H7 *escT*

FIG. 4

1A-1R = *Bacillus cereus*
2A-2Z = controls
3A-3R = *Campylobacter jejuni*
4A-4R = *E. coli*
5A-5R = *Yersinia enterocolitica*
6A-6R = *Staphylococcus aureus*
7A-B, 7E-L, 7O-T, 7W-X = *Shigella dysenteriae*
8A-8R = *Salmonella enterica*

1S-1X = Listeria monocytogenes
2S-2X = controls (UV are positive controls)
3S-3X = Listeria monocytogenes
4S-4X = Listeria monocytogens
5S-5X = E. coli O157:H7
6S-6X = E. coli O157:H7
7C-D, 7M-N, 7U-V = controls (UV are + controls)
8S-8X = E. coli O157:H7

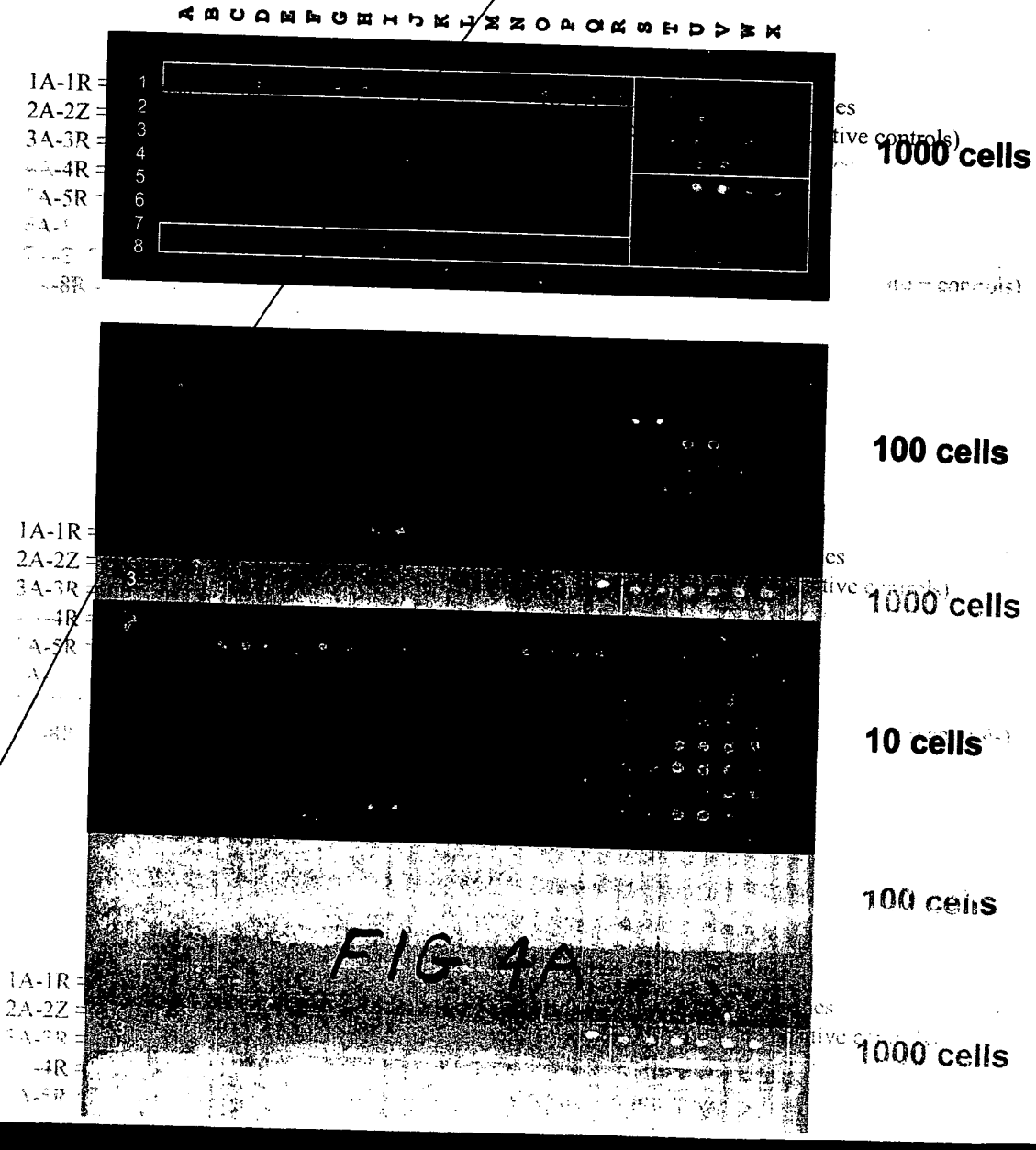

FIG 4A